

WHAT IS CLAIMED IS:

1. A method of determining a probability of an adverse event in connection with a loan based on a predetermined set of loan parameters, comprising:
 - determining whether loan variable data is available for each of the loan parameters;
 - if loan variable data is available for each of the loan parameters, estimating the probability of the adverse event within a period of time as a function of the loan variable data; and
 - if loan variable data is not available, estimating the probability of the adverse event within a period of time by imputing the loan variable data that is not available.
2. The method of claim 1, wherein imputing the loan variable data comprises performing a random draw from a set of errors generated in a partition operation.
3. The method of claim 2, wherein the partition operation generates sets of errors from loans in categories including never delinquent, delinquent no more than a first set number of days, delinquent no more than a second set number of days, and delinquent more than the second set number of days.
4. The method of claim 1, wherein imputing the loan variable data comprises utilizing a mathematical model constructed using a regression operation.
5. The method of claim 4, wherein the regression operation comprises estimating coefficients corresponding to the missing data.
6. The method of claim 4, wherein the mathematical model is a function of a subset of the predetermined set of loan parameters, coefficients estimated using a

regression operation, and a random draw from error values generated during construction of the mathematical model.

7. The method of claim 4, wherein the mathematical model is constructed using a set of loans for which the loan variable data is available.

8. The method of claim 4,
wherein the mathematical model is a function of a subset of the predetermined set of loan parameters, coefficients estimated using a regression operation, and a random draw from error values generated during construction of the mathematical model;

wherein the mathematical model is constructed using a set of loans for which the loan variable data is available;

wherein the coefficients are selected so as to minimize error between probabilities generated by the mathematical model and probabilities generated by an additional mathematical model that is a function of all of the predetermined set of loan parameters;

wherein the random draw of the error values is configured to preserve a probability distribution produced by the mathematical model and a probability distribution produced by the additional mathematical model.

9. The method of claim 4, wherein the predetermined set of loan parameters includes a credit premium, the credit premium reflecting a premium paid by a borrower in a note rate of the loan as compared to an average note rate of similar loans made to other borrowers.

10. The method of claim 1, wherein the probability of the adverse event is provided as a single numeric value which summarizes risk characteristics of the loan, risk characteristics of the collateral for the loan, and risk characteristics of the borrower associated with the loan.

11. A method of determining a probability of an adverse event in connection with a plurality of loans, the plurality of loans having varying amounts of loan data available, the method comprising:

constructing a first mathematical model for use with loans for which loan data is available for a set of explanatory variables, the set of explanatory variables including variables that relate to risk characteristics of the loan, risk characteristics of collateral for the loan, and risk characteristics of a borrower associated with the loan;

constructing a second mathematical model for use with loans for which at least some of the loan data for the set of explanatory variables is not available, including

estimating the probability of the adverse event for a first group of loans for which the loan data is available for the set of explanatory variables using the first mathematical model,

iteratively estimating the probability of the adverse event for the first group of loans using the second mathematical model,

selecting an optimal set of weighting coefficients for the second mathematical, the optimal set of coefficients being selected so as to minimize errors in outputs generated by the second mathematical model for the first group of loans relative to outputs generated by the first mathematical model for the first group of loans, and

storing a set of error values, the set of error values relating to the errors in the outputs generated by the second mathematical when using the optimal set of coefficients relative to the outputs generated by the first mathematical model; and

estimating the probability of the adverse event for a second group of loans using the second mathematical model, wherein at least some loan data for the set of explanatory variables is not available for the second group of loans, and wherein estimating the probability of the adverse event for the second group of loans includes randomly drawing error values from the set of error values and adjusting the outputs of the second mathematical model for the second group of loans in accordance with the randomly drawn error values, the randomly drawn error values causing a distribution of the probability values produced by the second mathematical model for the second group of loans to more closely match a distribution of the probability values produced by the first mathematical model for the first group of loans.

12. The method of claim 11, wherein the adverse event is delinquency.
13. The method of claim 11, wherein the adverse event is default.
14. The method of claim 11, wherein the adverse event is prepayment.
15. The method of claim 11, wherein storing the set of error values includes partitioning the error values into different partition groups, each respective error value being partitioned according to a length of time of delinquency of a corresponding one of the loans.
16. The method of claim 11, wherein the set of explanatory variables includes a credit premium, the credit premium reflecting a premium paid by a borrower in a note rate of the loan as compared to an average note rate of similar loans made to other borrowers.
17. A system configured to determine a probability of an adverse event in connection with a loan, the system comprising:
 - memory including loan variable data; and
 - processor coupled to the memory and operable to execute programmed instructions, wherein the programmed instructions:
 - (a) determine whether loan variable data for a particular loan is available in the memory;
 - (b) estimate the probability of the adverse event as a function of loan variable data, if available; and
 - (c) impute the probability of the adverse event, if loan variable data not available, using a mathematical model constructed based on linear regressions.
18. The system of claim 17, wherein the probability of the adverse event is determined as a single numeric value which summarizes risk characteristics of the loan, risk characteristics of the collateral for the loan, and risk characteristics of the borrower associated with the loan.

19. The system of claim 17, wherein the mathematical model is a function of a subset of the predetermined set of loan parameters, coefficients estimated using a regression operation, and a random draw from error values generated during construction of the mathematical model.

20. A method for determining a probability of an adverse event in connection with a loan for which loan data is unavailable for at least one of a predetermined set of loan parameters, the method comprising:

estimating a first set of weighting coefficients for a first mathematical model by performing a first regression operation, the first mathematical model being a function of the predetermined set of loan parameters and the first set of weighting coefficients, the first set of weighting coefficients being associated with respective ones of the predetermined set of loan parameters, the first regression operation optimizing the first set of weighting coefficients based on performance history of a plurality of loans, the plurality of loans having loan data available for the predetermined set of loan parameters;


estimating a second set of weighting coefficients for a second mathematical model by performing a second regression operation, the second model being a function of only a subset of the predetermined loan parameters and the second set of weighting coefficients, the second set of weighting coefficients being associated with respective ones of the subset of the predetermined set of loan parameters, the second regression operation causing the second mathematical model to produce a probability distribution which is in overall alignment with a probability distribution produced by the first mathematical, the second mathematical model further being a function of a set of stored error values relating to errors in probabilities produced by the second mathematical model as compared to probabilities produced by the first mathematical model; and

determining the probability of the adverse event using the second mathematical model, including performing a random draw of an error value from the set of stored error values.

21. The method of claim 20, wherein the errors are partitioned into categories according to length of loan delinquency.

22. The method of claim 20, wherein the set of loan parameters includes a credit premium, the credit premium reflecting a premium paid by a borrower in a note rate of the loan as compared to an average note rate of similar loans made to other borrowers.

23. The method of claim 22, wherein the credit premium is determined by starting with an initial note rate, adjusting the initial rate up and/or down in accordance with variables associated with the mortgage loan to arrive at a predicted note rate, and comparing the predicted note rate with a note rate paid by the borrower to arrive at the credit premium.

24. A loan performance prediction method comprising: 
determining coefficients for a first model based on a first loan data set;
determining coefficients for a second model based on outputs generated by the first model;
predicting a probability of an adverse event in connection with a loan using the second model, wherein the first model is a function of a first set of loan parameters and the second model is a function of a subset of the first set of loan parameters.

25. The method of claim 24, wherein the set of explanatory variables includes a credit premium, the credit premium reflecting a premium paid by a borrower in a note rate of the loan as compared to an average note rate of similar loans made to other borrowers.

26. The method of claim 25, wherein the credit premium is determined by starting with an initial note rate, adjusting the initial rate up and/or down in accordance with variables associated with the mortgage loan to arrive at a predicted note rate, and comparing the predicted note rate with a note rate paid by the borrower to arrive at the credit premium.

27. The method of claim 24, further comprising providing an output of the repeating the predicting step for a plurality of additional loans, grouping the loans according to at least one other parameter, and comparing risk characteristics of the groups of loans for the adverse consequence.

28. A system comprising:
memory including loan variable data; and
a processor coupled to the memory and operable to execute programmed instructions, wherein the programmed instructions configure the processor to:
perform calculations based on the loan variable data and based on a mathematical model, the mathematical model being a function of the predetermined set of loan parameters and a set of weighting coefficients, the predetermined set of loan parameters including parameters that relate to risk characteristics of the loan, risk characteristics of collateral for the loan, and risk characteristics of a borrower associated with the loan; and
based on the calculations, generate a single numeric value which summarizes the risk characteristics of the loan, the risk characteristics of the collateral for the loan, and the risk characteristics of the borrower associated with the loan.

29. The system of claim 28, wherein the single numeric value represents a probability of delinquency for the loan.

30. The system of claim 28, wherein the single numeric value represents a probability of delinquency for the loan.

31. The system of claim 28, wherein the single numeric value represents a probability of delinquency for the loan.

32. The method of claim 28, wherein the predetermined set of loan parameters includes a credit premium, the credit premium reflecting a premium paid by a borrower in a note rate of the loan as compared to an average note rate of similar loans made to other borrowers.